Supplementary material for: Stark contrast in denitrification and anammox across the deep Norwegian Trench: The Skagerrak. Mark Trimmer, Pia Engström and Bo Thamdrup.

Supplementary Table 1. Nutrient concentrations in the overlying water of the reference cores for the r-IPT assay prior to spiking with $^{15}NO_3^-$ (mean ± s.e., *n*=20) for the four sites. In addition, the maximum penetration depth for oxygen into the sediment (*n* = 6) is also given (O_2 pen), which was used to estimate the pre-incubation time required for the spike of $^{15}NO_3^-$ to reach the anoxic strata (see below).

Site	NH_4^+ (µM)	NO_3^- (µM)	NO_2^- (µM)	HPO_4^{2-} (µM)	O_2 pen (cm)	Pre-incubation time (h)*
S4	2.3 ±0.22	8.6 ±0.17	0.30 ±0.012	0.75 ±0.02	0.7 ± 0.04	3.5
S6	1.4 ±0.27	9.3 ±0.22	0.12 ±0.005	0.80 ±0.02	1.1 ± 0.07	8.7
S8	0.92 ±0.3	7.6 ±0.49	0.052 ±0.006	0.71 ±0.03	2.4 ± 0.09	41.8
S9	0.67 ±0.1	4.8 ±0.49	0.035 ±0.006	0.59 ±0.03	1.5 ± 0.07	16.1

*Note: the estimate of the time taken for $^{15}NO_3^-$ to diffuse to the anoxic sediment layers (O_2 pen) was based on a field estimate for porosity of 0.9 according to:

$$Time(s) = \frac{L^2}{Dsed \times 4}$$

$$Dsed = Ds \times \frac{\phi}{F}$$

$$F = \frac{1}{\phi^{1.3}}$$

Where L is the measured O_2 pen; Ds is the diffusivity for NO_3^- (1.2337×10^{-5} cm^2 s^{-1} in seawater at 7º) from (1); ϕ is the estimate of sediment porosity; F is sediment resistivity.

Supplementary Table 2. Results of a 2-way ANOVA with pair-wise comparisons* across all four sites for the ratio of ^{14}N to ^{15}N (r_{14}) in the N_2 and N_2O produced in the r-IPT sediment core incubations.

Site	$r_{14}N_2$	$r_{14}N_2O$	**Mean difference ± s.e.**	***P***
S4	1.129	1.014	0.115 ± 0.535	0.830
S6	1.636	2.210	-0.574 ± 0.479	0.233
S8	4.635	0.448	4.186 ± 0.594	<0.001
S9	3.575	0.447	3.128 ± 0.618	<0.001

*Significant interaction between N_2 and N_2O and site on r_{14} (P<0.000)

Supplementary Table 3. Anammox and total bacteria abundance in DNA extracted from sediment at the four sites. Anammox bacteria abundance is presented with the mean value from three replicate wells in the q-PCR run ± s.e. Ct values show the number of PCR cycles that were required to reach the fluorescence intensity threshold set for the analysis (see material and methods). Ct values >39 means undetectable, standard error for the Ct values never exceeded 0.7. Total bacteria abundance was estimated using a Nanodrop spectrometer to measure the amount of DNA extracted from the sediment. b.d. = below detection.

Site	Depth	Anammox bacteria. 16S rRNA copies g^{-1} wet sediment	Total bacteria cells g^{-1} wet sediment	Ct value	Mean value Anammox abundance for whole depth interval
S4	0-0.5 cm	$2.6x10^6$ ±$3.3x10^5$	$7.8x10^8$	32	$3.2x10^5$ ±$1.9x10^5$
	0.5-1 cm	b.d.	$5.6x10^8$	39	
	1-1.5 cm	b.d.	$9.2x10^8$	>39	
	1.5-2 cm	b.d.	$6.9x10^8$	>39	
	2-2.5cm	b.d.	$1.6x10^9$	>39	
	2.5-3 cm	b.d.	$1.2x10^9$	>39	
	3-4 cm	b.d.	$7.9x10^8$	>39	
	4-5 cm	b.d.	$5.7x10^8$	>39	
S6	0-0.5 cm	$4.2x10^4$ ±$6.2x10^3$	$8.2x10^8$	38	$2.9x10^5$ ±$1.1x10^5$
	0.5-1 cm	b.d.	$1.2x10^9$	>39	
	1-1.5 cm	b.d.	$7.6x10^8$	>39	
	1.5-2 cm	$3.3x10^5$ ±$1.4x10^5$	$1.4x10^9$	37	
	2-2.5 cm	$3.7x10^5$ ±$1.4x10^5$	$1.3x10^9$	36	
	2.5-3 cm	$1.1x10^6$ ±$3.0x10^5$	$1.6x10^9$	34	
S8	0-0.5 cm	$5.8x10^6$ ±$5.7x10^5$	$1.5x10^9$	31	$7.4x10^6$ ±$1.5x10^6$
	0.5-1 cm	$3.3x10^6$ ±$3.9x10^4$	$1.4x10^9$	32	
	1-1.5 cm	$4.1x10^6$ ±$2.9x10^5$	$1.4x10^9$	31	
	1.5-2 cm	$3.6x10^6$ ±$1.7x10^5$	$1.4x10^9$	32	
	2-2.5 cm	$1.1x10^7$ ±$1.5x10^6$	$1.4x10^9$	30	
	2.5-3 cm	$5.6x10^6$ ±$1.3x10^6$	$1.4x10^9$	31	
	3-4 cm	$2.2x10^7$ ±$4.0x10^6$	$9.9x10^8$	28	
S9	0-0.5 cm	$2.7x10^6$ ±$4.6x10^5$	$1.5x10^9$	32	$1.0x10^7$ ±$2.1x10^6$
	0.5-1 cm	$1.2x10^6$ ±$3.7x10^5$	$1.4x10^9$	33	
	1-1.5 cm	$1.0x10^6$ ±$5.9x10^4$	$1.7x10^9$	32	
	1.5-2 cm	$2.9x10^6$ ±$7.6x10^4$	$1.4x10^9$	30	
	2-2.5 cm	$7.4x10^6$ ±$9.9x10^5$	$1.3x10^9$	28	
	2.5-3 cm	$3.0x10^7$ ±$3.4x10^6$	$1.3x10^9$	27	
	3-3.5 cm	$2.5x10^7$ ±$5.3x10^6$	$1.3x10^9$	28	
	4-4.5 cm	$2.0x10^7$ ±$1.2x10^6$	$1.1x10^9$	28	
	4.5-5 cm	$9.6x10^6$ ±$2.1x10^6$	$1.1x10^9$	29	

1. **Li Y-H, Gregory S.** 1974. Diffusion of ions in seawater and in deep-sea sediments. Geochimica et Cosmochimica Acta **38:**703-714.